

HIGHLY CONFIDENTIAL-- ATTORNEYS' EYES ONLY

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UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA  
SAN FRANCISCO DIVISION

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ORACLE AMERICA, INC.,                    )  
                  Plaintiff,                    )  
vs.    ) No. CV 10-03561 WHA  
GOOGLE, INC.,                            ) VOLUME I  
                  Defendant.                    )  
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Videotaped Deposition of ROBERT VANDETTE,  
taken at 42 Chauncy Street, Boston,  
Massachusetts, commencing at 10:02 a.m.,  
Wednesday, September 7, 2011, before  
Jill Shepherd, RPR, MA-CSR No. 148608,  
NH-CSR No. 128, CA-CSR No. 13275, CLR,  
and Notary Public.

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1 case, and I will generally refer to it as 12:05:43	1 Q. Do you understand that there are 12:09:10
2 the "'104 patent." 12:05:47	2 different -- many different claims in the 12:09:22
3 A. Okay. 12:05:50	3 back of this patent that are being asserted 12:09:23
4 Q. Have you seen this patent before? 12:05:50	4 in this case? 12:09:25
5 A. Yes. I have seen this patent. 12:05:52	5 MS. AGRAWAL: Objection. Form. 12:09:26
6 Q. When? 12:05:54	6 A. I don't have that level of detail. I was -- 12:09:28
7 A. When I was asked to assist in the 12:05:56	7 as I mentioned, I came in April/May. The 12:09:35
8 measurements that are documented in my 12:06:03	8 discussions and the claims were developed 12:09:38
9 report. 12:06:08	9 prior to that. 12:09:41
10 Q. And you indicated, was that April/May time? 12:06:08	10 Q. So your only knowledge of what Android 12:09:46
11 A. Yeah, spring. 12:06:17	11 functionality should be disabled for your 12:09:49
12 Q. Did you review the '104 patent? 12:06:19	12 tests is based on what you were told by 12:09:54
13 A. I did read it. 12:06:22	13 Peter Kessler and Professor Mitchell; is 12:09:57
14 Q. Do you believe you understand it? 12:06:23	14 that correct? 12:10:01
15 MS. AGRAWAL: Objection. Form. 12:06:34	15 MS. AGRAWAL: Objection. Form. 12:10:01
16 A. I'm not a patent attorney, so I relied on 12:06:34	16 A. We came to the conclusion of what to disable 12:10:05
17 Dr. Mitchell to interpret it. 12:06:45	17 during these discussions with them. I'm not 12:10:20
18 Q. Have you reviewed the asserted claims of the 12:06:47	18 sure if I -- 12:10:25
19 '104 patent? 12:06:54	19 Q. You personally did not have knowledge 12:10:27
20 MS. AGRAWAL: Objection. Form. 12:06:54	20 necessary to determine what functionality 12:10:29
21 A. As I have already mentioned, I did see an 12:06:57	21 should be disabled? 12:10:32
22 early draft of the asserted claims around 12:07:01	22 MS. AGRAWAL: Objection. Form. 12:10:33
23 the same April/May time frame. 12:07:05	23 A. I am not a patent attorney, so I did not 12:10:35
24 Q. Do you know which claims are currently being 12:07:09	24 have the skill to interpret patent law. 12:10:42
25 asserted from this patent? 12:07:12	25 Q. Is Professor Mitchell or Peter Kessler a 12:10:46
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1 MS. AGRAWAL: Objection. Form. 12:07:14	1 patent attorney? 12:10:49
2 A. I have kind of a high level understanding of 12:07:19	2 MS. AGRAWAL: Objection. Form. 12:10:49
3 what the claims are asserting. 12:07:47	3 A. My assumption is that they worked with 12:10:51
4 Q. In paragraph 26 of your report, on 12:07:50	4 patent attorneys outside of the discussions 12:10:58
5 page eight, you say, and I quote, "I ran 12:08:04	5 with me. 12:11:02
6 experiments to disable the Android 12:08:09	6 Q. Do you understand that different claims in 12:11:04
7 functionality that Oracle accuses of 12:08:11	7 the '104 patent might accuse slightly 12:11:10
8 infringing the '104 patent"; is that 12:08:15	8 different -- might be asserted against 12:11:14
9 correct? 12:08:18	9 slightly different functionality and they 12:11:17
10 A. Which page are you on? 26? 12:08:18	10 are not identical? 12:11:19
11 Q. Paragraph 126. 12:08:20	11 MS. AGRAWAL: Objection. Form. 12:11:22
12 A. Oh, 126. 12:08:22	12 A. You have to be more specific. I don't -- 12:11:22
13 Q. 26. 12:08:24	13 it's too general a question. 12:11:34
14 A. What page are you on? 12:08:25	14 Q. Were you asked to disable functionality 12:11:42
15 Q. Page eight. 12:08:28	15 corresponding to any particular claim of the 12:11:45
16 A. Page eight. That's what I missed. Yes. 12:08:29	16 '104 patent? 12:11:50
17 Q. How do you know what functionality was 12:08:36	17 MS. AGRAWAL: Objection. Form. 12:11:51
18 accused? 12:08:38	18 A. It was explained to me that I needed to 12:11:53
19 MS. AGRAWAL: Objection. Form. 12:08:40	19 disable the SideTable class resolution of 12:12:09
20 A. I had conversations with Dr. Mitchell where 12:08:41	20 methods, classes, and fields, and that the 12:12:16
21 he explained the infringing areas, and also 12:08:49	21 quickening of byte codes also needed to be 12:12:22
22 had discussions with Mr. Peter Kessler, and 12:08:56	22 disabled -- 12:12:24
23 through these discussions, we came up with 12:09:03	23 Q. You don't -- 12:12:29
24 modifications to the Android sources that 12:09:06	24 A. -- but I don't know exactly which claim in 12:12:30
25 could disable this functionality. 12:09:08	25 the patent corresponds to that 12:12:32
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1	functionality.	12:12:37	1	A. I can't quantify that.	12:15:57
2	Q. In paragraph 40 to 41, on page ten of your	12:12:38	2	Q. Are there less than 100 improvements?	12:15:58
3	report, is there a significant difference in	12:13:04	3	MS. AGRAWAL: Same objection.	12:16:02
4	performance between the original Froyo	12:13:13	4	A. There's actually no way -- I have not been	12:16:04
5	Android code and your modified code with	12:13:15	5	involved in every Java VM and library	12:16:16
6	side tables, but no quickening instructions?	12:13:18	6	improvement that has gone on. There's no	12:16:19
7	MS. AGRAWAL: Objection. Form.	12:13:21	7	way for me to even come up with a number.	12:16:22
8	A. So as you can see from the chart below,	12:13:22	8	Q. How many people have been involved in this	12:16:25
9	there's not much of an impact. There is	12:13:31	9	task?	12:16:30
10	some impact.	12:13:35	10	MS. AGRAWAL: Objection. Form.	12:16:30
11	Q. Would you say that impact is significant?	12:13:38	11	A. Any number I give you would just be a guess.	12:16:31
12	MS. AGRAWAL: Objection. Form.	12:13:41	12	Q. That's fine.	12:16:57
13	A. If you look at the spreadsheet with the data	12:13:43	13	MS. AGRAWAL: Objection. Form.	12:16:58
14	and look at the standard deviation, it is	12:13:50	14	A. And so the fact that I have to tell the	12:17:00
15	statistically significant.	12:13:54	15	truth here, I'm not going to guess.	12:17:07
16	Q. In your professional opinion, regarding the	12:13:57	16	Q. On page four of your report in paragraph 14,	12:17:08
17	performance of the Dalvick Virtual Machine,	12:14:02	17	you say, "The engineering team at Oracle	12:17:22
18	do you believe this change in performance is	12:14:10	18	continues to invest heavily in R&D targeted	12:17:25
19	significant?	12:14:12	19	at increasing performance. A large portion	12:17:28
20	MS. AGRAWAL: Objection. Form.	12:14:13	20	of our virtual machine engineering team is	12:17:30
21	A. As I stated at the beginning of my report,	12:14:14	21	typically dedicated to performance	12:17:34
22	at Oracle and other companies, we spend a	12:14:24	22	improvement projects."	12:17:34
23	lot of engineering effort to get even small	12:14:26	23	And then you go on to give some	12:17:35
24	incremental performance improvements. So,	12:14:30	24	examples; is that correct?	12:17:38
25	yes, I do believe it's significant in that	12:14:36	25	A. Yes.	12:17:39
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1	regard.	12:14:38	1	Q. And you said that this has been going on	12:17:39
2	Q. How much time has Oracle and Sun before that	12:14:40	2	since the beginning of Java development?	12:17:43
3	spent making incremental improvements to	12:14:58	3	A. Correct.	12:17:45
4	Java Virtual Machine?	12:15:03	4	MS. AGRAWAL: Objection. Form.	12:17:45
5	MS. AGRAWAL: Objection. Form.	12:15:05	5	Q. Java was released in somewhere in '94, '95;	12:17:46
6	A. There's no way to quantify that. It's been	12:15:07	6	is that correct?	12:17:52
7	going on since the beginning of Java.	12:15:12	7	MS. AGRAWAL: Objection. Form.	12:17:52
8	Q. How many incremental improvements are there?	12:15:14	8	A. I would have to refer back to some files to	12:18:01
9	MS. AGRAWAL: Objection. Form.	12:15:17	9	know the exact date of Java. It was	12:18:04
10	A. We could produce, you know, a chart of	12:15:20	10	probably the early '90s, but the exact date	12:18:07
11	SPECjbb improvements since the beginning of	12:15:23	11	I don't know. This paragraph is talking	12:18:10
12	time, but every release has increased.	12:15:25	12	only about the virtual machine performance	12:18:11
13	Q. So there's been an ongoing chain of	12:15:30	13	improvements. There are other teams working	12:18:13
14	improvements?	12:15:37	14	in other areas of Java.	12:18:15
15	A. Right.	12:15:37	15	Q. Okay.	12:18:17
16	Q. Going back over ten to 15 years --	12:15:37	16	Would it be wrong to make the	12:18:26
17	MS. AGRAWAL: Objection.	12:15:40	17	assumption that there are probably thousands	12:18:28
18	Q. -- at least?	12:15:41	18	of incremental improvements that have been	12:18:30
19	MS. AGRAWAL: Form.	12:15:42	19	going on since the mid '90s with respect to	12:18:33
20	A. There's -- yes. There's been ongoing	12:15:44	20	the Java Virtual Machine?	12:18:36
21	performance improvements since Java first	12:15:47	21	MS. AGRAWAL: Objection. Form.	12:18:38
22	came out.	12:15:50	22	A. You are asking me to guess, and I can't	12:18:40
23	Q. How many improvements would there be? Ten?	12:15:50	23	guess.	12:18:44
24	50? 100?	12:15:53	24	Q. You don't know?	12:18:51
25	MS. AGRAWAL: Objection. Form.	12:15:55	25	MS. AGRAWAL: Objection. Form.	12:18:52
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<p>1 Q. I'm not asking you for a specific number. 12:18:58</p> <p>2 Give me a general ballpark figure. 12:19:01</p> <p>3 MS. AGRAWAL: Objection. Form. 12:19:03</p> <p>4 A. You are asking me to describe changes or 12:19:04</p> <p>5 incremental performance improvements in 12:19:11</p> <p>6 groups that I really wasn't involved in. 12:19:14</p> <p>7 Q. Turning to page eight, paragraph 28 of your 12:19:47</p> <p>8 report, you discuss the modifications that 12:19:50</p> <p>9 you made to conduct your experiments; is 12:20:00</p> <p>10 that correct? 12:20:03</p> <p>11 A. Yes. 12:20:03</p> <p>12 Q. And you created these modifications based on 12:20:03</p> <p>13 what you were told by Professor Mitchell and 12:20:14</p> <p>14 Peter Kessler; is that correct? 12:20:18</p> <p>15 MS. AGRAWAL: Objection. Form. 12:20:19</p> <p>16 A. Yes. We discussed the functionality, and 12:20:20</p> <p>17 Peter I both looked through the sources to 12:20:27</p> <p>18 try to find out how to properly disable this 12:20:31</p> <p>19 functionality, and we came to a consensus. 12:20:33</p> <p>20 Q. It appears that you attempted two out of 12:20:42</p> <p>21 three possible scenarios here? 12:20:46</p> <p>22 A. That's correct. 12:20:49</p> <p>23 MS. AGRAWAL: Sorry, objection. 12:20:49</p> <p>24 Form. 12:20:51</p> <p>25 Q. The first scenario in paragraph 28 is 12:20:53</p> <p style="text-align: right;">Page 82</p>	<p>1 A. It would impact the results potentially, 12:22:15</p> <p>2 since I'd be adding additional functionality 12:22:18</p> <p>3 to Dalvick that it doesn't currently have. 12:22:20</p> <p>4 Q. It would, however, be technically possible 12:22:24</p> <p>5 for someone to do so? 12:22:26</p> <p>6 MS. AGRAWAL: Objection. Form. 12:22:34</p> <p>7 A. Let's see. It may be technically possible 12:22:34</p> <p>8 to build a system that does quickening 12:22:57</p> <p>9 without side tables, but it would involve 12:23:01</p> <p>10 adding additional overhead that Dalvick 12:23:03</p> <p>11 doesn't currently have. 12:23:08</p> <p>12 Q. In paragraph 36, you state that you did not 12:23:10</p> <p>13 try running the trace compiler; is that 12:23:19</p> <p>14 correct? 12:23:23</p> <p>15 A. Oh, paragraph -- sorry. That is correct, 12:23:23</p> <p>16 for the same reason that we didn't do the 12:23:35</p> <p>17 quickening alone. 12:23:37</p> <p>18 Q. What is the trace compiler? 12:23:38</p> <p>19 MS. AGRAWAL: Objection. Form. 12:23:42</p> <p>20 A. That is Dalvick's implementation of a JIT. 12:23:43</p> <p>21 Q. Are you saying that for your performance 12:23:51</p> <p>22 benchmark regarding the '104 patent you had 12:24:01</p> <p>23 to disable the JIT? 12:24:04</p> <p>24 MS. AGRAWAL: Form. 12:24:06</p> <p>25 A. That's correct. 12:24:07</p> <p style="text-align: right;">Page 84</p>
<p>1 building side tables, but not quickening 12:20:58</p> <p>2 instructions, and the second scenario is not 12:20:59</p> <p>3 building side tables or quickening 12:21:03</p> <p>4 instructions; is that correct? 12:21:06</p> <p>5 A. That's correct. 12:21:08</p> <p>6 Q. Is there a third possibility of not building 12:21:10</p> <p>7 side tables, but building quickening 12:21:16</p> <p>8 instructions? 12:21:20</p> <p>9 MS. AGRAWAL: Objection. Form. 12:21:22</p> <p>10 A. The quickening was dependent upon the side 12:21:22</p> <p>11 table for its implementation in order to 12:21:27</p> <p>12 avoid, you know, any possible error in the 12:21:30</p> <p>13 results. We did not want to substantially 12:21:37</p> <p>14 modify Dalvick in order to try to attempt 12:21:39</p> <p>15 that. We wanted to restrict our changes to 12:21:43</p> <p>16 just simple commenting out of code that 12:21:47</p> <p>17 would provide the before and after. 12:21:48</p> <p>18 Q. So if it got too complicated, you did not 12:21:51</p> <p>19 attempt it? 12:21:55</p> <p>20 MS. AGRAWAL: Objection. Form. 12:21:55</p> <p>21 A. It's not an issue of complication. It's an 12:21:56</p> <p>22 issue of possibly altering the Dalvick to 12:22:00</p> <p>23 the point where I wouldn't be measuring what 12:22:10</p> <p>24 I wanted to measure. 12:22:12</p> <p>25 Q. It would be -- 12:22:13</p> <p style="text-align: right;">Page 83</p>	<p>1 Q. Do you understand that the JIT is not part 12:24:08</p> <p>2 of the accused functionality of the '104 12:24:13</p> <p>3 patent? 12:24:18</p> <p>4 MS. AGRAWAL: Objection. Form. 12:24:18</p> <p>5 A. I'm not certain that it isn't somehow 12:24:19</p> <p>6 involved in some of the claims, but we 12:24:40</p> <p>7 focused on turning off the functionality in 12:24:46</p> <p>8 a mode that was possible. 12:24:49</p> <p>9 Q. If, in fact, JIT is not part of the accused 12:24:54</p> <p>10 functionality, then wouldn't disabling it 12:25:08</p> <p>11 affect the performance of this benchmark? 12:25:16</p> <p>12 MS. AGRAWAL: Objection. Form. 12:25:20</p> <p>13 A. I do believe that the numbers would be 12:25:21</p> <p>14 slightly different; however, the overhead of 12:25:28</p> <p>15 having to re-resolve all of the classes, 12:25:34</p> <p>16 fields, and methods is a fixed overhead that 12:25:38</p> <p>17 the JIT could not compensate for. So I 12:25:42</p> <p>18 believe the performance reduction or 12:25:47</p> <p>19 degradation would still be substantial. 12:25:52</p> <p>20 Q. Despite fixed overhead, you are referring to 12:26:03</p> <p>21 other aspects of the benchmarking programs 12:26:08</p> <p>22 might execute faster if the JIT was enabled; 12:26:10</p> <p>23 is that correct? 12:26:14</p> <p>24 MS. AGRAWAL: Objection. Form. 12:26:15</p> <p>25 A. They would be severely diminished by the 12:26:16</p> <p style="text-align: right;">Page 85</p>

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## HIGHLY CONFIDENTIAL-- ATTORNEYS' EYES ONLY

<p>1 I declare under penalty of perjury 2 under the laws that the foregoing is 3 true and correct.</p> <p>4</p> <p>5 Executed on _____, 20____, 6 at _____, _____.</p> <p>7</p> <p>8</p> <p>9</p> <p>10 _____ 11 ROBERT VANDETTE</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p> <p style="text-align: right;">Page 122</p>	<p>1 INDEX</p> <p>2 WITNESS PAGE</p> <p>3 ROBERT VANDETTE</p> <p>4 Examination by Mr. Francis</p> <p>5</p> <p>6 EXHIBITS</p> <p>7 NO. DESCRIPTION PAGE</p> <p>8 Exhibit 460 Defendant's Notice of 8 Rule 30(B)(1) Deposition of Robert ("Bob") G. Vandette</p> <p>9</p> <p>10 Exhibit 461 Summary and Report of 10 Robert ("Bob") Vandette</p> <p>11</p> <p>12 Exhibit 462 Presentation 41 (A JIT Compiler for Dalvik VM)</p> <p>13</p> <p>14 Exhibit 463 Dhrystone White Paper 58</p> <p>15 Exhibit 464 OAGOOGL0014151624 - 63 OAGOOGL0014151630</p> <p>16 Exhibit 465 OAGOOGL0011198304 - 66 OAGOOGL0011198305</p> <p>17</p> <p>18 Exhibit 466 US Patent No. RE 38,104 73</p> <p>19</p> <p>20 Exhibit 467 US Patent No. 6,910,205 91</p> <p>21</p> <p>22 Exhibit 468 OAGOOGL0014151618 - 113 OAGOOGL0014151623</p> <p>23 Exhibit 469 OAGOOGL0019108076 - 114 OAGOOGL0019108077</p> <p>24</p> <p>25 Exhibit 470 OAGOOGL0023688735 - 115 OAGOOGL0023688745</p> <p>26 Exhibit 471 OAGOOGL0024644910 118</p> <p style="text-align: right;">Page 124</p>
<p>1 CERTIFICATE</p> <p>2</p> <p>3 COMMONWEALTH OF MASSACHUSETTS</p> <p>4 MIDDLESEX, SS.</p> <p>5</p> <p>6 I, Jill Shepherd, Notary Public, in and for the Commonwealth of Massachusetts, 7 do hereby certify that:</p> <p>8 ROBERT VANDETTE, the witness whose deposition taken on September 7, 2011 is 9 hereinbefore set forth, was satisfactorily identified by means of driver's license, and 10 was duly sworn by me, and that the foregoing transcript is a true and accurate record of 11 the testimony given by such witness and such testimony is a true and accurate 12 transcription of my stenotype notes to the best of my knowledge, skill, and ability.</p> <p>13 I further certify that I am not related to any of the parties in this matter 14 by blood or marriage and that I am in no way interested in the outcome of this matter.</p> <p>15 IN WITNESS WHEREOF, I have hereunto 16 set my hand and notarial seal this 8th day 17 of September, 2011.</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23 _____ Jill Shepherd, RPR 24 Notary Public 25 My Commission expires: April 18, 2014</p> <p style="text-align: right;">Page 123</p>	

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